

## Breeding of Sistan Yaghouti Grape using Clonal Selection

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### Abstract

Sistan Yaghouti grape belongs to the category of seedless grapes which are resistant to diseases and they have an uninterrupted growth in adverse conditions. Sistan weather usually has hot wind and salty soil. In order to increase the fruit quality, we investigated vine yards of Sistan areas such as Zahak, Dust-Mohammed and Bonjar and collected samples of Yaghouti grape. Traits of Yaghouti grape were calculated using Descriptor method. Results showed that Yaghouti grape clones had high variation in traits such as density of branch, size of berry, weight of berry, weight of branch and height of branch. Therefore, it can be said that clonal selection is suitable method for breeding of grape for good branch quality. Collected seedlings were also planted in Zahak agriculture research station for further evaluation and stability of traits with respect to location and season.

**Keywords:** Yaghouti grapevine; Clonal selection; Sistan

### Introduction

Grapevine is an important horticulture plant in Sistan area which has been cultured currently. Important cultivar grape in Sistan are red Yaghouti, white Yaghouti, Fakhri, Sangak, Amiri, Laal, Haji Abbasi, Cow eye, Ghandehari, Mayemish, Gholami and Shastarous. Red Yaghouti grapevine belong to seedless grapes group which is resistance to diseases and grow in conditions of Sistan weather which usually have hot winds and salty soil, also they mature early and are harvested in June. So it is economically useful for Sistan people. But branches of this grape have low density with small berries and have low quality fruit.

In plant breeding methods, generally breeding method corresponds with the biological properties of the plant to be generated biologically. Breeding of fruit trees becomes very difficult because of their seasonal growth and longer growth periods. For effective investigation many cross breeds are required between the parents and subsequently a good number of progeny to examine upon the genetic basis of inheritance. Therefore, for multiannual plants such as fruit trees, clonal selection is useful [1]. Selection is process of choosing the best single plants from the heterogenic population. Efficiency of selection is related to content of genetic variation, heritability and kind of selection method [2].

According to breeders, a three stage evaluation system (A, B and C) for clonal selection is efficient. The three stage selection resulted in clones with high yield, free from diseases and production of homogeny yard vines [3].

Subject of this research was selection of red Yaghouti grapevine with large berry, low density and high yield.

### Materials and Methods

In order to evaluate, Sistan red Yaghouti grapevines were collected from grapevines of different region of Sistan such as Zahak region, Jazinak region, Hirmand region and Bonjar region. From each region, they were randomly selected, and then the best trees were chosen and were signed. Fruits of these trees were harvested and plantlets from the trees were selected. Selected plantlets were transported to station of agriculture research located to Zahak and were cultured in pool. Traits such as length of branch, length of berry, weight of single branch, weight of berry, and density were calculated based on descriptor method. Analysis of data was calculated using SAS software version 9.1 [4].

### Results and Discussion

Collected grapevines from the different region of Sistan showed high variability for the investigated traits. According to table 1, mean weight of 5 branches were variable. Mean weight of berry were in range of 4.26 to 7.43. Density of branch has direct relation with weight of berry and increase in weight of berry resulted in low density. Therefore, in order to breed Yaghouti grape and to decrease the branch density, these methods should be used which in turn increase the weight of berry. The vines shifted to Jazinak had almost high quality of branch

Area	Weight of branch	Weight of berry	Length of berry	High branch
Zahak	144.15	6.44	8.77	12.33
Zahak	142.02	6.00	7.90	9.66
Zahak	120.23	5.36	7.52	10.56
Zahak	129.63	6.95	8.52	11.20
Zahak	130.65	7.12	8.85	11.69
Jazinak	135.13	7.43	9.11	12.00
Jazinak	123.92	5.77	7.72	11.00
Jazinak	120.93	5.85	7.96	10.68
Jazinak	142.32	6.25	8.21	09.21
Jazinak	120.45	5.98	7.26	11.26
Hirmand	130.58	7.26	9.45	11.78
Hirmand	118.95	4.26	6.64	10.29
Hirmand	120.96	5.26	6.28	10.59
Bonjar	125.36	5.96	6.89	11.36
Bonjar	128.96	6.23	6.68	11.56
Bonjar	130.26	6.86	6.28	11.23
Bonjar	134.26	5.89	6.29	10.86

**Table 1:** Means of investigating traits in Yaghouti grape.

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density, weight of berry and length of berry. It seems that there is an inverse relationship between the length of the branch and cluster density. Vine yards which belong to Mr. Rigi had high density branches and small berry size. Vine yard which belong to Jahanbakhsh located in Hirmand region had low density of branch, large berry and were with high quality. Coefficient of correlation analysis showed that weight of berry had significant correlation with length of berry (0.641) and also with height of branch (0.542). Notzuka et al. [5] used induced polyploid grapes using *in vitro* chromosome and the resulting 4X grapes had bigger size of berry than 2X grapes. In the first stage, trees which had low density, height of branch and large berry were signed and selected and then plantlets were cultured for second stage selection. In the second stage selection, trees which will have high quality will be selected for experimental stability.

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